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ABSTRACT

This study was conducted to identify those variables that differentiate between those who choose to become teachers and those who have demonstrated competence in science and mathematics but do not choose to become teachers. Comparisons were made of the values and perceptions of career choices of all seniors in the college of education of the University of Georgia and of those seniors in the same university's college of arts and sciences who were pursuing bachelor of science degrees. A two-part questionnaire was employed. The first part asked respondents to rate the importance of 10 variables that influence career choices and the second part asked them to rate the attractiveness to teaching in terms of the same 10 variables. The variables included: (1) salary; (2) fringe benefits; (3) security; (4) job market; (5) working conditions; (6) contributions to society; (7) prestige; (8) advancement opportunity; (9) interesting work; and (10) congenial co-workers. Statistically significant differences were found between the groups on six of the ten variables in terms of their importance at the time career choices were made and on nine of the ten factors in terms of the attractiveness of teaching. Capable science and mathematics students who did not major in education considered salary, conditions of the job market, prestige and ooportunities for advancement to be more important in selecting a career than education majors. Specific strategies are offered and outlined for increasing the supply of science and mathematics teachers. (ML)

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PSYCHOLOGICAL CONSIDERATIONS IN THE RECRUITMENT OF SCIENCE AND MATHEMATICS TEACHERS

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PSYCHOLOGICAL CONSIDERATIONS IN THE RECRUITMENT OF SCIENCE AND MATHEMATICS TEACHERS

Oliver Fred McManus and Kenneth M. Matthews

Several conditions have resulted in a renewed emphasis on the recruitment of science and mathematics teachers. In recent years there has been inadequate number of people prepared to teach science and mathematics (Graybeal, 1983). At the same time, efforts are being made to increase the amount of science and mathematics being taught to public school students (National Commission on Excellence in Education, 1983). Because past efforts have not resulted in an adequate supply, there is a need for a critical analysis of the reasons why capable students have not chosen to become teachers of science or mathematics. The logical base for this analysis begins with a consideration of factors involved in the process of choosing a career.

Factors Affecting Career Choices

A review of the literature reveals that virtually all authorities agree there are a number of careers that could utilize the talents of and be rewarding for most individuals. Authorities also agree that the career choices made by individuals are influenced by their perceptions of how well their desires and needs would be met by the viable career alternatives. The major considerations involved in choosing a career are indicated below.

Salary

Because salary serves so many needs it is a major consideration in selecting a career (cf. Andrew, 1983; Fielstra, 1955; Ginzberg, Ginsburg, Axelrad, & Herma, 1951; Hartford, 1948;

Herzberg, 1957; Hood, 1965; Krumboltz, 1979; Lortie, 1975; Ornstein & Miller, 1980; Page, Page, & Shelton, 1982; Richards, 1960; Roberson, Keith, & Page, 1983; Super, 1957).

Fringe Benefits

Although less clearly defined than salary, fringe benefits are also important considerations in the choices of careers (cf. Andrew, 1983; Fielstra, 1955; Herzberg, 1957; Page et al., 1982; Super, 1957).

Security

The importance of security to those choosing teaching as a career is well known; however, it is also an important consideration for many others (cf. Andrew, 1983; Fox, 1961; Hartford, 1948; Haubrich, 1960; Herzberg, 1957; Hood, 1965; Ornstein & Miller, 1980; Page et al., 1982; Richards, 1960; Roberson et al., 1983; Super, 1957; Thomas, 1956).

Job Market

Closely related to security, the availability of jobs also affects career decisions. It is not uncommon, nor unreasonable, for individuals to seek security in their occupations by considering the condition of the job market (cf. Andrew, 1983; Fox, 1961; Herzberg, 1957; Hood, 1965; Krumboltz, 1979; Ornstein & Miller, 1980; Page et al., 1982).

Working Conditions

The conditions under which individuals believe they will work in their chosen occupations affect their choices. When all other factors are considered equal individuals choose those careers they believe will provide the most favorable working conditions (cf.

Fielstra, 1955; Haubrich, 1960; Herzberg, 1957; Lortie, 1975; Page et al., 1982; Richards, 1960; Super, 1957).

Contributions to Society

Although teachers are commonly assumed to value the opportunity to make a contribution to society highly, it is also an important consideration of other groups (cf. Andrew, 1983; Fielstra, 1955; Fox, 1961; Herzberg, 1957; Hood, 1965; Jantzen, 1981; Lortie, 1975; Ornstein & Miller, 1980; Page et al., 1982; Richards, 1960).

Prestige

In addition to the altruistic concern for making a contribution to society, the level of prestige associated with a particular career affects whether one will choose that career or not (cf. Fielstra, 1955; Fox, 1961; Ginzberg et al., 1951; Haubrich, 1960; Herzberg, 1957; Hood, 1965; Krumboltz, 1979; Lortie, 1975; Page et al., 1982; Super, 1957).

Advancement Opportunities

Although not as wide-spread a concern as some of the other factors, careers having opportunities for advancement are perceived more favorably (cf. Andrew, 1983; Fielstra, 1955; Ginzberg et al., 1951; Herzberg, 1957; Ornstein & Miller, 1980; Richards, 1960; Super, 1957; Thomas, 1956).

Interesting Work

The fact that a particular occupation involves interesting work makes it more attractive (cf. Andrew, 1983; Fielstra, 1955; Fox, 1961; Ginzberg et al., 1951; Herzberg, 1957; Krumboltz, 1979; Richards, 1960; Roberson et al., 1983).

Congenial Co-Workers

Finally, it appears that being able to work with congenial co-workers affects the choice of a career (cf. Herzberg, 1957; Richards, 1960; Roberson et al., 1983; Super, 1957; Thomas, 1956).

Because these 10 factors are the major considerations involved in the choice of a career, it is logical to expect that successful efforts to recruit science and mathematics teachers would focus on 1 or more of these factors. The key lies in the selection of those factors where the likelihood of success is greatest.

A Study

In order to identify those factors that differentiate between those who choose to become teachers and those who have demonstrated competence in science and mathematics but do not choose to become teachers a study was conducted. The study compared two groups in terms of their values and perceptions of career choices.

The Population

Three different age groups were considered for study: high school students, college students, and adults who had completed four-year degrees. High school students were rejected for two reasons. One, many high school students have not made commitments to specific careers and of those who have many will change their minds prior to graduation from college. Two, no acceptable data were available indicating particular high school students who would seek and secure the training necessary to become science or mathematics teachers.

Adults who had completed four-year degrees were also rejected. Although science and mathematics teachers and other college graduates could be identified, it was believed that their experiences after graduation would affect their recollections of the perceptions they had at the time they made their decisions on college majors significantly. In other words, they were considered to be unreliable subjects.

The population selected for study was comprised of all seniors in the college of education and those seniors in the college of arts and sciences who were pursuing bachelor of science degrees from the University of Georgia. This population was selected for several reasons. One, seniors in the college of education were considered to be representative of the population who had chosen education as a career and had made those decisions recently enough to provide reasonably reliable data concerning the factors affecting those decisions. Two, seniors in the college of arts and sciences who were pursuing bachelor of science degrees were selected because they had completed enough course work in mathematics and science to demonstrate competence in these areas and had also made their decisions on college majors recently.

Data

The researchers wished to be able to make 2 comparisons between college of education seniors and college of arts and sciences seniors: (a) the relative importance of the 10 factors affecting career choices and (b) the relative attractiveness of teaching as a career in terms of the same 10 factors. To facilitate the efficient collection of these data a two-part questionnaire was developed. The first part of the questionnaire

asked the respondents to rate the importance of each of the 10 factors at the time they made their career choices. The second asked them to rate the attractiveness of teaching in terms of the same 10 factors (McManus, 1985, pp. 144-45).

To test the reliability of the instrument it was administered on a test-retest basis to 48 seniors in a local college. The Pearson product moment correlations for individual questions ranged from .75 to .93 with a mean correlation for the total instrument of .82 (McManus, 1985, p. 83). Because of the strong literature base for each of the factors the instrument was assumed to have content validity.

The questionnaires were mailed to all members of the two groups and complete responses were received from 453 of the 707 college of education seniors and from 476 of the 727 college of arts and sciences seniors.

Findings

Statistically significant ($p < .05$) differences were found between the 2 groups on 6 of the 10 factors in terms of their importance at the time career choices were made.

1. Arts and sciences majors rated salary significantly higher in importance than education majors.

2. Arts and sciences majors rated the job market significantly higher in importance than education majors.

3. Education majors rated opportunities to make a contribution to society significantly higher in importance than arts and sciences majors.

4. Arts and sciences majors rated prestige significantly higher in importance than education majors.

5. Arts and sciences majors rated opportunities for advancement significantly higher in importance than education majors.

6. Education majors rated having congenial co-workers significantly higher in importance than arts and sciences majors (McManus, 1985, p. 99).

In terms of the attractiveness of teaching as a career there were statistically significant differences between the ratings of the 2 groups on 9 of the 10 factors. Only on the attractiveness of teaching in terms of opportunities to make a contribution to society was there no significant difference between the two groups. Education majors rated teaching more attractive as a career than did arts and sciences majors in terms of salary, fringe benefits, security, job market, working conditions, prestige, advancement opportunities, interesting work, and congenial co-workers (McManus, 1985, p. 101).

Conclusions

To the extent that the findings of this study can be generalized to the larger population of capable science and mathematics students several important conclusions may be drawn.

Capable science and mathematics students who do not major in education differ significantly from education majors. They consider salary, the condition of the job market, prestige, and opportunities for advancement to be more important factors in selecting a career than do education majors.

Capable science and mathematics students who do not major in education do not differ from education majors in their perceptions of the attractiveness of teaching in terms of being able to make

contributions to society. The altruism they do exhibit is insufficient to attract them into education.

Individuals who choose to major in education consider teaching to be more attractive as a career in terms of salary, fringe benefits, security, job market, working conditions, prestige, advancement opportunities, interesting work, and congenial co-workers than capable science and mathematics students who do not major in education.

Implications

If the assumption is made that recruitment efforts are not likely to alter values, then it is important that perceptions and conditions be changed if we are to recruit capable individuals to teach science and mathematics. It is obvious from the findings of this study that an appeal to altruism will not be an effective tool for recruiting science and mathematics teachers from a population that values salary, prestige, and opportunities for employment and advancement more highly than education majors. They perceive teaching to be just as attractive in terms of being able to make a contribution to society as education majors, but they do not choose to major in education. Continued appeals to altruistic behavior will not likely be any more effective in the future than it has in the past in recruiting science and mathematics teachers. More effective recruitment efforts must focus on those factors considered important by those we have not successfully recruited.

Altering Perceptions

Apparently arts and sciences majors have faulty perceptions of the number of jobs available in public schools. When it is

taken into consideration that the jobs available for science and mathematics teachers far exceed the supply then it is obvious that the potential for altering perceptions in this area is great.

Although we may never succeed in altering perceptions of the opportunities for advancement within education to compete with the idealistic and frequently naive expectations for the future held by college students, we can emphasize the opportunities that do exist. For example, we can emphasize the fact that principals are almost always recruited from the ranks of teachers. Other opportunities for advancement exist in the areas of business management, plant operation and maintenance, community relations, personnel services, as well as those available in the specialized areas of curriculum and instruction. These opportunities can be emphasized in recruitment efforts.

Although most capable science and mathematics students outside of education may realistically expect higher salaries than those currently paid to teachers, many do not expect to receive salaries higher than those paid to teachers. In fact, about one-sixth of the arts and science seniors polled indicated they expected to earn less than the average education senior expected to earn. Changing the perceptions of this group has the potential to increase the population of science and mathematics teachers significantly.

It is commonly assumed that the profession of teaching has declined in prestige, yet many teachers have high status within their communities. They hold offices in many civic organizations and are the ones most frequently asked to assume leadership roles in community activities. Perhaps, the single most effective means

of altering the perceptions of the prestige of teaching is to alter the perceptions teachers have of themselves.

Changing Conditions

The current job market for science and mathematics teachers is such that the demand exceeds the supply and the demand is projected to increase. Thus, the job market is expected to become even more attractive.

With the current emphasis on educational excellence many districts are creating opportunities for teachers to fill instructional leadership positions at the school level. Other advancement opportunities are also becoming more numerous. For example, individual schools and school districts are serving larger numbers of students and as they increase in size specialized jobs are being created.

The salaries paid to teachers continue to lag behind those paid to others with comparable levels of training. The patterns of raises given in the past have resulted in only temporal improvements in the relative salaries of teachers. It seems that once the status of teachers' salaries is improved, it is given little consideration until it becomes embarrassingly low. Even though salaries constantly change, they become competitive only intermittently.

Recommendations

The following strategies are recommended for increasing the supply of science and mathematics teachers by focusing on salaries, the job market, opportunities for advancement, and prestige.

One - Opportunities should be created for teachers to be paid significantly higher salaries. It may not be necessary to raise the salaries of all teachers significantly. Because most people believe they merit higher salaries based on superior performance (cf. Royal, 1983, pp. 38 - 54), it may only be necessary to create opportunities for some teachers to obtain higher salaries in order to attract more capable science and mathematics students into teaching careers.

Two - The condition of the job market for science and mathematics teachers should be communicated more extensively. Teaching vacancies in the areas of science and mathematics are numerous. Many are filled with those prepared as teachers of other disciplines, but who are not trained in the areas of science or mathematics. It is particularly important that this information be communicated to the population of capable science and mathematics students.

Three - The opportunities for advancement that exist for teachers should be communicated more extensively and more opportunities for advancement should be created. Advancement within education is largely into administrative and supervisory positions. Even though the percentage of administrative and supervisory positions in education is comparable to other occupations, it is desirable that more positions which will be perceived as advancement within the career of teaching be created.

Four - Educators should take a more active role in promoting teaching as a prestigious career. Creating the image of teaching as being a profession of high status must involve educators. Although status is always in the eye of the beholder, the image is

created in large part by the ones being observed. If teachers do not hold themselves in high esteem it will be difficult for them to convince others that they have high status.

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